

Keeping Our Drinking Water Safe Using Faster Cutting-Edge Technologies

Author: Maura Donohue

U.S. EPA/Office of Research and Development (ORD)/National Exposure Research Laboratory (NERL)/Microbiological Chemical Exposure Assessment Research Division (MCEARD)/Chemical Exposure Research Branch (CERB)

Keywords: clean water, proteomics, state-of-the-art technology, mass spectrometry, virulence

Clean drinking water is an absolute necessity for healthy living. To protect this critical resource, faster, better, and cheaper methods must be developed to quantify any risks from exposure to microbial contaminants in drinking water. To address this need, the National Exposure Research Laboratory (NERL) is supplementing classical microbiological methods with state-of-the-art instrumentation and information technology to identify these risks. New threats to drinking water will require this kind of sophisticated analysis. Using Matrix-Assisted Laser Desorption/Ionization-Time-of-Flight Mass Spectrometry (MALDI-TOF MS), peptides and proteins that are important in understanding the virulence of pathogens can be analyzed. If further information is needed about a desired virulence-related protein, NERL scientists are equipped to sequence the protein's peptides to elucidate the amino acid structure using Nanoelectrospray-Mass Spectrometry/Mass Spectrometry (NanoES-MS/MS). Databases (e.g., MASCOT™) can then be searched using the Scientific Office of the Future (SOF) fast computing capability for positive identification of proteins. Ultimately, the use of these highly advanced technologies is expected to lead to discoveries that would have been impossible with conventional technology. Through the identification of new risk factors, better methods for assessing the virulence of microorganisms may be developed. Ultimately, this is an example of why the American public and future generations can rely on US EPA to continue to make sound science-based decisions that will lead to cleaner and safer drinking water.

Disclaimer: *Although this work was reviewed by EPA and approved for publication, it may not necessarily reflect official Agency policy.*

Point of Contact:

Maura Donohue
Research Chemist
U.S. EPA/ORD/NERL
26 W. Martin Luther King Drive
Cincinnati, OH 45268
513-569-7634
donohue.maura@epa.gov